



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/663,375	09/16/2003	Murali Sethumadhavan	RGP-0122	1622
23413	7590	04/08/2005	EXAMINER	
CANTOR COLBURN, LLP 55 GRIFFIN ROAD SOUTH BLOOMFIELD, CT 06002			LAM, CATHY FONG FONG	
			ART UNIT	PAPER NUMBER
			1775	

DATE MAILED: 04/08/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/663,375

Applicant(s)

SETHUMADHAVAN ET AL.

Examiner

Cathy Lam

Art Unit

1775

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 09 February 2005.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) 17-21 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,3-16,22 and 23 is/are rejected.
- 7) ☒ Claim(s) 2 and 24 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 February 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All   b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 01-21 & 02-09-2005.
- 4) ☒ Interview Summary (PTO-413)  
Paper No(s)/Mail Date 03-31-2005.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

In view of the amendment filed on February 9<sup>th</sup> 2005, the objections and 112 rejections have been withdrawn. The pending claims however are continued to unpatentable under the following rejections:

***Election/Restrictions***

1. This application contains claims 17-21 are drawn to an invention nonelected with traverse. A complete reply to the final rejection must include cancellation of nonelected claims or other appropriate action (37 CFR 1.144) See MPEP § 821.01.

***Claim Rejections - 35 USC § 112***

2. Claims 3, 23 and 24 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claims 3 & 23, it is vague and indefinite as to whether or not both type of fillers are treated with a coupling agent or just the mineral filler (as originally claimed) is treated with a coupling agent? Clarification is required.

Claim 24 is indefinite, as there is no conductive layers being claimed.

***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 5-15 and 22 are rejected under 35 U.S.C. 102(b) as being anticipated by Furuta et al (US 6124004).

Furuta discloses a laminate comprised of a layer of liquid crystalline polymer and a metallic foil. The laminate is particularly useful for circuit boards or a multilayer circuit board (col 1 L 15-21).

The metallic foil is preferably copper foil on which a b-stage or a molten liquid crystalline polymer is coated (col 12 L 18-21, L 34-37). The laminate can be two metallic foils sandwiching the LCP layer or any desirable arrangements (col 12 L 38-45).

The liquid crystalline polymer may be impregnated with fibrous material such as glass fiber, inorganic filler such as silica and organic fillers (col 12 L 56-57, col 13 L 4-6, col 10 L 23-26 & L 33). Additives such as flame retardant can be added to the LCP (col 10 L 33-39).

An adhesive such as a hot melt adhesive which is analogous to a flowable dielectric material (as in claim 16) can be used between the LCP resin layer and the metallic foil (col 12 L 10-21).

Furuta discloses several working examples, all of them has a dielectric constant below 2.5 (col 18 Table 3 & col 19 Table 4).

Furuta's laminate has an excellent heat resistance, low dielectric constant, low dielectric loss constant and low water absorption (col 2 L 38-40).

Furuta although is silent about a dissipation factor and its flame resistance rating. Since Furuta's laminate includes all the necessary ingredients, it would be inherent that Furuta's laminate possesses the same properties.

***Claim Rejections - 35 USC § 103***

2. Claims 1, 3-16 and 22-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Furuta et al (US 6124004) in view of Berger et al (US 6528145).

Furuta teaches the present invention but is silent about using a coupling agent to treat the inorganic fillers.

Berger discloses a composite for used in electronic substrates. The composite is comprised of a polymeric material, a filler material and a metal conductor.

The polymeric material can be a liquid crystalline polymer (col 5 L 45-46). A glass ceramic material is used as a filler impregnated into the polymer resin, the glass ceramic material can be SiO<sub>2</sub>, silica, and quartz, etc. and the glass ceramic material can be in the form of powder or fibers, etc. (col 6 L 48-54). The glass ceramic filler is first treated with coupling agents (col 8 L 1-3).

A metal conductor such as copper is plated onto the surface of the filled polymer material (col 7 L 54-55). The metal conductor can be formed onto one or both surface of the polymer material (col 7 L 36-45).

Berger's composite has a low dielectric constant of 3.5 or less and a low moisture absorption (< 1 %) (col 5 L 31-32 & col 6 L 40-43).

Both Furuta and Berger teach the present invention but are silent about some properties claimed by the applicant.

In view of the prior art teachings, one skill in the art would choose a liquid crystalline polymer resinous material and impregnate it with a desired filler material(s)

because choosing the materials (or ingredients) directly affecting the properties of the layer and such doing is a matter of design choice.

***Allowable Subject Matter***

3. Claim 2 objected to as being dependent upon a rejected base claim, but would be allowable if incorporate into independent claims.
4. Claim 24 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action.

***Response to Arguments***

5. Applicant's arguments filed on February 9, 2005 have been fully considered but they are not persuasive.

***Conclusion***

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Cathy Lam whose telephone number is (571) 272-1538. The examiner can normally be reached on 9am-6pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Deborah Jones can be reached on (571) 272-1535. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
Cathy Lam  
Primary Examiner  
Art Unit 1775

cfl  
March 31, 2005